Modernization of Municipal Solid Waste Management in Bulgaria

Project Title: Modernization of Municipal Solid Waste Management in Partnership with the Private Sector: A Danube River Initiative
Leader: Association of Danube River Municipalities (ADRM) (Danube Region, Bulgaria)
Partners: Institute for Environmental Strategies, Ltd. (Sofia, Bulgaria) and CalRecovery Inc. (Hercules, CA, USA)
Location: Danube Region, Bulgaria
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EcoLinks Project Investment: Total Project Investment: $49,972; EcoLinks Grant Support: $37,492; Project Team Cost Share Contribution: $12,480.

Best Practice: Transferable Solution

This project is a Best Practice for several reasons. It provides a model for regional collaboration and efficiency in the management of solid waste. The project's regional approach can be adopted by other small municipalities in Central and Eastern Europe and NIS. The Diagnostic Research of Municipal Solid Waste Management (MSWM) of the Danube Region developed in this project provides a template of a demand-driven tool that is useful in targeting technical assistance for communities and identifying opportunities for improvement in solid waste management. Specifically, the diagnostic survey can be used to address particular problems of different localities while inspiring regional solutions. This averts a "cookie cutter" approach and allows for problems to be defined at the local level while broadening the possibilities for creative solutions that can only be generated on a regional scale.

Project Summary

The management of solid waste in the Danube Region of Bulgaria presents several challenges. The quantities of agricultural crop residues and manure are increasing due to the urbanization of the agricultural sector since the collapse of communism. Appropriate methods for managing agricultural waste have not been established. Many active dumpsites do not meet modern environmental standards, threaten groundwater supplies and ultimately impact the ecological status of the Danube River. The collection and disposal of solid waste in the Region is frequently inefficient and lacking proper equipment and tools. More regional collaboration and coordination involving both public and private sectors is needed to better assess the problems and generate creative, efficient solutions.

The Danube Region of Bulgaria, totaling 8,800 km^2 is mainly rural and it is divided into twenty-four municipalities that make up the members of the Association of Danube River Municipalities (ADRM). The population is approximately 730,000. Of the twenty-four municipalities, twenty have organized waste management services and have kept reports on the quantities and composition of waste. The total amount of waste generated by these twenty municipalities (490,000 people) is 333,000 tons/year.

With an EcoLinks Challenge Grant, ADRM assembled a project team to identify and explore ways for improving the management of solid waste in the Danube Region of Bulgaria. Several key actions were taken: 1) a diagnostic survey was conducted to assess the specific challenges and opportunities related to solid waste management, 2) based on the results of the survey, appropriate technical assistance was developed to target specific needs, and 3) two workshops were held to share information, initiate and build collaborative efforts for implementation of a regional, modern solid waste management program. Based on the survey and the workshops several subprojects were initiated including the development of a demonstration program for composting manure at a local dairy cooperative, an equipment upgrade, and improving cooperation and coordination among the Region's municipalities and establishing partnerships with the private sector. Several environmental and economic benefits were generated, especially by the multiple subprojects, including reduced air pollution and lowered collection and disposal costs.

Project Activities

The main project goal was to improve municipal solid waste management (MSWM) and to create opportunities for public private partnership in MSWM for the Bulgarian Association of Danube River Municipalities (ADRM). The project's main objectives were as follows:

- Formulate cost-effective and market-based solutions to MSWM
- Transfer of techniques for waste minimization
- Enhance public awareness of good practices in MSWM
- Promote regional cooperation between municipalities

- Transfer of techniques for the establishment of public-private partnerships (PPP)
- Promotion of private investment in MSWM in the Region

The project consisted of five main processes: an initial workshop; diagnostic assessment using a survey; interviews and field research; technical assistance and the development of subprojects, and a final workshop. They are outlined in detail below.

1. Conducted initial workshop

Action: A workshop titled, "Practical Approaches for Modernization of Solid Waste Management," was conducted to provide a forum for collaboration between project participants and between project participants and municipality representatives. Thirty-seven people representing the municipalities, NGOs and the media attended. This workshop stressed the exchange of information between project participants and municipality representatives about possibilities and problems with solid waste management in the Danube Region. For example, one daunting problem that municipalities face regarding solid waste management is insufficient means to deal with large amounts of agricultural waste. Through this exchange between project members and attending municipalities, a work plan for initiating a composting program was developed.

Product(s): 1) Workshop, "Practical Approaches for Modernization of Solid Waste Management," 2) Thirty-seven people trained in modern solid waste management approaches 3) Collaboratively defined problems in municipal solid waste management 4) Work plan for a composting program.

2. Conducted second workshop

Action: This workshop consisted of the training of municipal representatives and others in the theory and practice of composting organic waste. Instruction was given in the classroom as well as in the field. A composting demonstration was conducted with the assistance of a local dairy cooperative using locally available animal manure and straw as feedstocks. Representatives of the cooperative were additionally given instruction on initiating, maintaining, and monitoring the composting process.

Product(s): 1) Workshop on the theory and practice of composting organic waste 2) Composting demonstration 3) Instruction to local dairy cooperative on composting.

3. Conducted "Diagnostic Research of MSWM of the Danube Region"

Action: A survey involving extensive interviews and field visits was conducted regarding the status of solid waste management in the Danube Region of Bulgaria. The target audience of the survey was:

- Twenty four Danube River Municipalities;
- Policy makers;
- External funding agencies; and
- Potential private strategic investors.

The data gathered included information about the equipment, methods, costs, and management structure involved in collecting and transporting solid waste. The survey was used additionally as a diagnostic tool to determine the opportunities for improving solid waste management. The main problems gathered from the survey results were as follows:

Organization of MSWM

- Existing organization is inefficient;
- The frequency of the waste collection is rare;
- The vehicles are not full on some trips to the landfills;
- Only the main towns have organized service; and
- There is no separate collection for agricultural waste, manure and ash.

Waste Generation

- There is no reliable measurement of generated waste; and
- The amount of the generated agricultural waste and manure is high and is mixed with household waste.

Equipment and vehicles

- The vehicles are obsolete and too expensive to operate and maintain; and
- The containers are too old and too few.

Landfills

- There are too many authorized landfills;
- Generally, the landfills are poorly operated in terms of management of land use;
- Some closed landfills could use remediation to mitigate their probable environmental impacts;
- Almost all of the landfills are uncontrolled and without security (e.g., a guard and gate); and
- Landfills in the smaller towns are mainly used for disposal of agricultural crop waste and manure since they make up the majority of this type of waste produced and requiring disposal in these locations.

Financial issues

- The waste fee is insufficient to cover the cost for waste management; and
- The expenses for maintenance and repair are too high.

Basic recommendations resulting from the survey are as follows:

Organization

- New know how should be introduced for modern waste management through modernization of municipal waste management companies, and privatization of the service or the company;
- Organized waste management should be introduced to all settlements.

Waste Generation

- Measurement stations should be installed in some of the landfills; and

- Agricultural manure and organic waste should be handled separately and wherever feasible through composting.

Equipment and vehicles

- Modern vehicles with compacting systems should be introduced;
- The old containers should be gradually replaced and standardized;
- Most of the landfills should be closed; and
- At first, there should be no more than one landfill in each settlement, later landfills should become regionalized.

Financial issues

- Replacement of the existing vehicles with modern equipment will reduce operating costs; and
- Use fees should be introduced on guarded landfills.

The results of the survey, interviews, and field visits were then used as a basis for targeting technical assistance to design and carry out the following subprojects:

- Modernizing equipment and introducing more efficient management practices in MSWM;
- Establishing public private partnership;
- Improving landfilling practices and rehabilitation;
- Identifying opportunities for cooperation between municipalities in developing regional landfills;
- Minimization of the waste by composting of agricultural and organic waste; and
- Promoting micro-enterprises for MSWM in towns without organized services.

Product(s): 1) Survey 2) Published results of the diagnostic survey with EcoLinks in a document titled, "Survey of Municipal Solid Waste Management in the Danube Region" 3) Recommendations.

4. Developed subprojects and provided Technical Assistance on MSWM

Action: The technical assistance provided to Municipalities was demand driven. The Municipalities (members of ADRM) agreed with the Project Team Members as to their needs for assistance and the method of delivering it. The initiated subprojects were as follows:

a) Modernization of the Waste Collection Equipment in Belene, Nikopol and Gulyantzi;
b) Cooperation between the Municipalities for Construction of a Regional Landfill for Household Waste in Oriahovo;
c) Waste Minimization in Borovo Municipality;
d) Privatization of MSWM in Vidin Municipality;
e) Environmental Service by Small and Medium Enterprise in Tsenovo; and
f) Public Awareness Campaign.

A list of typical documents generated for every subproject includes multi-option financial analysis of different solutions, analysis of legal options for cooperation between institutions, draft agreements for cooperation, applications to Environmental Agencies (e.g., the National Environmental Fund) for financial support, tender documents, draft contracts, and promotional materials. For the subproject in Borovo Municipality, a pilot composting project was implemented that provided the necessary data for developing guidelines on the collection and composting of organic waste and manure.

Product(s): 1) Six subprojects that yielded important information for modernizing solid waste management 2) Recommendations and alternatives for reducing waste, reducing the costs of waste collection and disposal, and improving opportunities for the construction of a regional landfill and for collaboration with the private sector 3) Subproject documents including templates for building public-private partnerships, including examples of contracts for services and tender documentation that can be used in other similar circumstances 4) Upon the successful application for funds from the National Environmental Fund in Bulgaria, two member municipalities in the Danube Region were supplied with a modern waste collection vehicle and containers.

5. Conducted final workshop for planning follow-up activities

Action: In this workshop, alternatives and recommendations from each subproject were presented. These alternatives and recommendations are published in a paper, "Guidelines on Modernization of MSWM." Follow-up activities were discussed.

Product(s): Publication: "Guidelines on Modernization of MSWM" a public awareness campaign specifically generated several designs for an informative brochure and posters, two case studies, and an overall public awareness campaign strategy.

Project Benefits

This project generated multiple benefits. The workshops, community based research, and public outreach efforts provided forums for information exchange and building relationships that facilitate the overall capacity of the Region to address solid waste management problems. Multiple environmental benefits were achieved including reductions in air, water, and soil pollution. The economic benefits generated by this project include reduced collection, disposal, and landfill construction costs.

Capacity Building Benefits

This project produced important capacity building benefits. The project workshops served to distribute and exchange information as well as strengthen collaborative ties in the Region. They furthermore provided the context for identifying and clarifying local problems, coordinating solid waste management both among municipalities and between municipalities and the private sector, and exploring different funding mechanisms.

In addition to the workshops, the survey, interviews, other fieldwork, and public outreach efforts facilitated capacity building by engaging a relevant network in a discussion of solid waste management issues which both improves understanding of the issues as well as helps to generate creative solutions. Municipalities increased their capacity to address solid waste management problems in a creative way as demonstrated in part by the multiple subprojects. Each subproject produces important knowledge that can then also be used by others to implement similar subprojects.

Environmental Benefits

The environmental benefits derived from this project included reduced air pollution, waste minimization and improved soil quality, leachate prevention, and improved regulation.

Reduced air pollution. The collaborative purchase of new trucks and containers for transportation and disposal of waste reduced air pollution from fuel exhaust since there were fewer trucks carrying fuller loads and making fewer trips to the dumpsite. Trucks with compactors require fewer trips to the dumpsite.

Waste minimization and improved soil quality. The recommendations for implementing a composting program for organic waste provided ways for minimizing waste, reducing water pollution, and improving soil conditions. The implementation of a composting program would divert organic waste from the landfills avoiding increased contamination of surface and ground waters and environmental damage to the Danube River. Through composting, organic waste is transformed into a useful material that improves soil quality.

Leachate prevention. If implemented, a modern regional landfill would be more sanitary than localized, unregulated landfills. A modern landfill is more effective in preventing leachate than localized landfills that tend to be poorly regulated.

Improved regulation. With the promotion of public-private partnerships, the municipalities could take on a stronger regulatory role while allowing the private sector to take care of waste collection and disposal activities. With improved regulation of solid waste collection and disposal, environmental damages can be minimized.

Economic Benefits

Each subproject provided alternatives for generating several economic benefits. The economic benefits from these subprojects are discussed below.

Reduced annual expenses of waste collection and disposal. Purchasing co-shared machinery with a five-year payback period (as promoted by the Bulgarian National Environment Protection Fund) and weekly collection can reduce county annual expenses associated with waste collection and disposal approximating fifty percent. In some counties annual costs are reduced by more than fifty percent. Belene County could reduce annual expenses for machinery and containers and direct expenses of waste collection from $43,943 to $22,199, reducing its annual costs by $21,744. In Oriahovo County, the existing collection system costs $26,657 per year. With

upgraded co-shared equipment, annual costs would be $10,508, an annual savings of $16,149. With a twice-a-week disposal scheme, expenses would be even less with 15 to 20% cost reduction compared to the existing waste collection and disposal system.

Reduced financial and management burdens for municipalities. By opening up the provision of solid waste management services to private enterprises, certain economic benefits may be realized. Municipalities may be entitled to dividends from sold shares. Capital flow is increased and can be used to invest in new equipment that can lead to further savings. Municipalities can take on a predominantly regulatory role possibly decreasing their workload.

Reduced construction costs. It is less costly to engage counties in a collaborative effort to construct a regional landfill than to reconstruct municipal landfills. For example, with four participating counties of the Danube Region including Oriahovo, Kozlodui, Mizia, and Kneza, the expenses associated with the construction of a regional landfill would be $1,819,588. The total reconstruction value of existing municipal landfills would be more costly at $3,729,700. Constructing a regional landfill, therefore, could provide a savings of $1,910,340.

Greater conservation of landfill space and increased value of soil. Several economic benefits are accrued from composting organic waste. Composting organic waste diverts waste from 1) unregulated sites where it can cause environmental damage, which is costly to repair or mitigate, and 2) the municipal landfills where the increased load adds to transportation costs and unnecessarily places burdens on these. In some communities in the Region, manure constitutes 70% of the total waste generated. Manure compost has a high nutrient content. It can, therefore, be used to increase the value and crop yield of marginal agricultural soils. The economic value inherent in the nutrient content can be realized as an in-kind payment to employees who help to process the organic waste or by selling the compost to cover the cost of composting the material.

Lessons Learned

The following lessons were learned during this project:

- Local government elections can delay project implementation as transition to the new governing body takes place. Further, support from newly elected officials may need to be recruited and adjustments to the project may have to be made to consider their perspectives.

- "Thinking regionally" is generally new to Bulgarian municipalities. It may be necessary to train municipalities to think on a regional level to help them to conceptualize and implement projects at the regional scale.

- The needs and interests of the different parties should be clarified during discussions to initiate public-private partnerships.-

- The viability of commercial activities regarding solid waste management needs to be clearly articulated to municipalities to make it a priority agenda item.

- A low-cost alternative to the EU-standard landfill should be explored because in the near- to medium-term municipalities may not be able to financially support high-technology landfill operations.

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